

A. Contractor's Planting Equipment

1. Planting Tools - Contractor's planting tools shall meet the following minimum requirements:
 - A. Planting tools shall be capable of making a planting hole the width and depth needed to satisfactorily plant the seedlings furnished by the Government. Tree seedling species and average root length are listed elsewhere herein.
 - B. A hoe type tool shall be used. **Shovel planting will not be allowed.**
 - C. Hand tools - where hand planting is specified, the hand tools used shall have a **minimum 12 inches length and 4 inches minimum width planting blade**, unless otherwise specified. The head or scalping blade of a hoedad shall not be included in the maximum length measurement.
 - D. Auger planting will require an auger bit a minimum of 4" in diameter and capable of making a hole a minimum of 12" in depth. Power head shall be in good working condition and free of leaks.

B. Contractor's Seedling Handling Equipment

1. Planting Bags
 - A. Planting bags shall be a light color, shall not retain heat, shall have a minimum depth of 15 inches and shall be free of defects or contaminants.
 - B. **Insulated planting bags or planting bags with insulated inserts are required.**

C. Care of Seedlings

1. The Contractor shall adhere to the following specifications for care and protection of tree seedlings:
 - A. Seedlings shall be protected at all times from drying, heating, smothering, freezing, crushing, drowning, abrasion, rapid temperature fluctuations or contact with injurious substances.
 - B. Seedlings stored in boxes, bags or bundles shall not be exposed to direct sunlight. Punctured or torn bags or boxes shall be promptly resealed. Containers of seedlings shall be opened only in full shade. Bundles, bags, or boxes shall be separated to provide free air movement.
 - C. Seedlings shall not be removed from delivery vehicle or shipping containers until needed for preparation for planting. The Government shall issue trees from the vehicle in the proper ratio for the planting unit.
 - D. Seedlings shall be planted without further root or top pruning or culling. If pruning or culling appears necessary, or if mold, dry roots, evidence of injury, or drying is seen, the condition shall immediately be reported to the Contracting Officer.

- E. Seedlings removed from cold storage facilities shall not be allowed to stand or lay in water or snow or be covered with snow.
- F. Seedlings in planting bags shall have only their tops exposed.
- G. Seedlings shall not be removed from a planting bag until immediately before planting in a prepared hole.
- H. Seedlings shall be gently removed, one at a time, to prevent stripping or other injury, and quickly and gently inserted into the planting hole.
- I. Seedlings carried in planting bags shall not exceed the amount that can be carried or removed without injury, or which can be planted before critical heating or drying occur. Seedlings placed in planting bags shall be planted out and not returned to storage. A maximum of 200 seedlings per planting will be allowed under favorable conditions.
- J. Bags of seedlings shall not be carried into the unit and stored for later planting, unless Government field storage facilities are provided.
- K. Unplanted seedlings shall be returned to the Government at the end of each working day.
- L. Seedlings in bags shall be planted out before extended breaks, such as lunch. At the Contracting Officer's discretion, seedlings left in planting bags before extended breaks shall be placed in shade or the tree truck. Trees thus stored during extended breaks shall be planted before the planting bags are refilled.
- M. The number of seedlings in the planting bag shall not exceed - Bare root 200, container stock 120, and may be further decreased depending on severity of drying conditions, size of seedlings, size of the bag and/or duration in the planting bag; i.e., not to exceed two (2) hours.
- N. The Contractor shall not use the hoe blade to guide the seedling roots into the planting hole.

2. Only if Option Item D35B is exercised, Transportation of Seedlings

- A. Contractor shall transport seedlings from Government storage to the planting site, and back to Government storage, in an insulated transportation storage unit and a four wheel drive pickup which will be supplied by the Contractor.
- B. Contractor shall not crush seedlings.
- C. Transportation storage unit shall be free of substances that may harm seedlings such as gas or oil.

- D. Contractor shall provide a space blanket to effectively cover all stored seedlings inside of transportation storage unit. Space blanket will be equivalent of international Reforestation Suppliers catalog "heat shield" seedling protection tarp. It shall have a durable white vinyl fabric on one side and a reflective metallic finish on the other side.
- E. Contractor shall maintain the air temperature below 45 degrees Fahrenheit within the bags. Seedlings within bags which have an inside air temperature above 45 degrees Fahrenheit may be considered wasted seedlings and Contractor charged accordingly. If the temperature rises to 42 degrees Fahrenheit within bags, Contractor shall supply enough ice or snow to keep seedling temperature from rising above 45 degrees.
- F. Contractor is responsible for making sure correct ratio of tree species is planted in each item in the areas identified. Variations greater than 10% of designated species ratio may be charged as wasted trees.

D. Preparation of Seedlings

- 1. Prior to placing seedlings in planting bags, Contractor shall break or otherwise remove rubber bands so that no injury occurs to the roots.
- 2. Contractor supplied dipping containers shall be deep enough to submerge seedling root systems.
- 3. The Contractor shall dip roots of bare root seedlings in water to wet them prior to placing seedlings in planting bags. Seedlings shall remain in the water at least 1 minute but not longer than 2 minutes. Contractor shall supply the water and container for dipping.
- 4. Trees or bundles shall not be whipped or struck against any object to remove excess water after dipping.
- 5. All seeding preparation shall be accomplished in shaded areas protected from winds. Roots shall be kept moist at all times. Excess dipping solution shall not be shaken, or otherwise removed from trees before they are placed in the planting bag.

E. Spacing and Spot Selection**1. Seedlings Spacing Requirements:**

- A. Seedlings shall be planted to the boundary of all planting areas and around the perimeter of unplatable areas in spots distributed at intervals prescribed. For individual seedlings, the specified average spacing may be varied no more than 25 percent in any direction to find a suitable planting spot or as defined in the planting data sheets.
- B. Where an unplatable spot is encountered, the planter shall plant in the closest plantable spot; however, average spacing shall be maintained.
- C. Items which have Planting by the Thousands on the Schedule of Items or Detailed Unit Information Sheet. There are many small areas within several harvest units that require

planting. Since these small areas are very difficult to measure by the acre, they will be planted, inspected, and paid for on the basis of the number of seedlings planted. The Government will direct the Contractor to the small openings within the harvest units needing trees. Accurate spacing is critical in planting these small openings. Not all plantable spots within a harvest unit will be planted. Planted seedlings shall not be planted closer than 80 percent of the specified spacing. Trees planted closer than 80 percent of the specified spacing will be considered wasted. For example: for 9' x 9' spacing, trees cannot be planted less than 7.2' apart.

2. Planting Spot Selection:

- A. Brush patches containing planting spots shall be planted even though this may require spreading stems aside or working around the stems. Landings, road cuts and fill banks shall be planted where planting spots exist.
- B. Whenever possible, within the 25 percent variance in average spacing, planting spots shall be prepared where stumps, logs, dead brush, and terrain features provide partial protection from sun, wind, animals, loose debris, and other agents detrimental to seedlings.
- C. Planting spots shall not be located in the tracks left by crawler tractors or rubber tired skidders, harvester forwarders, skid trail berms, or mounds of soil unless otherwise designated by the Contracting Officer.

F. Planting Spot Preparation

- 1. Prior to preparing the planting hole, Contractor shall clear the planting spot of all limbs, logs, snow, bark, rotten wood, rocks and other loose debris and shall scalp ash, duff, sod, crowns of living plants, and roots to moist mineral soil. Clearing and scalping dimensions shall be as shown on the Planting Data Sheets.
- 2. A full benched or terraced scalp shall be constructed on slopes that exceed 45 percent unless otherwise specified on the Detailed Unit Information Sheet(s) (also called Performance Requirement Summary Sheets). The minimum bench width shall be half the dimension of the scalp size listed in the Detailed Unit Information Sheets(s).
- 3. If mineral soil cannot be found within the scalping depth as specified on the planting data sheets, a scalp shall be made to the depth specified, and the tree planted.

G. Preparing the Planting Hole

1. Planting holes shall be located near the center of the prepared planting spot and shall be between perpendicular to the ground surface and true vertical.
2. For Hand tools:
 - A. An open hole, broken out as shown in Exhibits D and D1, and deep and wide enough to fully accommodate the roots of the seedlings to be planted is required when hand planting tools are used. The planting hole shall be broken out on four sides, with the back of the hole being broken out after the seedling is suspended in the center of the hole.
3. For Auger Planting:
 - A. Planting hole shall be made 2" inches deeper than the average root length. When a planting spot is determined to be unplantable at least 3 attempts will have been made in the scalp location to create a planting hole. See Exhibit F.

H. Seedling Placement

1. Bare Root Seedlings - The bare root seedling shall be suspended near the center of the hole with roots in a near natural arrangement at a depth such that, after filling, firming, and leveling, the soil comes to a point at or ½ inch above the cotyledon scar of the tree. No portion of the roots shall be exposed nor any live needles or branches covered with soil. Roots shall not be doubled up, twisted, spiraled, or bunched. The root system shall be aligned with the axis of the planting hole with all roots extending downward. See Exhibit G.
2. Containerized Seedlings - Seedlings shall be planted in the center of the prepared hole, deep enough so that ½ to 1 inch of soil is placed on top of the plug, level with the surrounding soil surface, to seal the plug into the ground. Plug growing media shall not be distorted or broken from the root system during the planting process. See Exhibit I.

I. Filling and Firming

1. Moist mineral soil shall be filled in and firmed around seedling roots. Dry soil, ash, organic matter, rock and other foreign material shall be kept out of holes. Soil shall be filled in and firmed progressively so no loose soil or air pockets remain and the seedling is as firmly planted as soil conditions will allow. The Contractor shall not wedge the sides of the hole. Firming the soil around the roots shall be accomplished in a manner that assures the seedling and root system are not damaged. After the soil is firmed around the roots, it shall be smoothed out to the level of the surrounding mineral soil surface. After planting, the seedling stem shall be erect and free to grow. The seedling shall not be weighted down with mud or debris.
2. After planting, the seedling stem position shall not exceed 15 degrees from true vertical.

3. For hand planting sub-items, a hoedad may be used to firm the soil in the manner shown in Exhibit D. Soil firming shall be accomplished while the seedling is held suspended near the center of the hole. Firming soil with the foot will not be permitted.
4. For auger planting sub-items, the bottom of the hole shall be firmed before placing the seedling in the planting hole. The planting hole should be filled and firmed a minimum of 1/3 at a time while the seedling is suspended in the center of the planting hole. Seedlings planted on the side of the planting hole and not near the center will be considered unacceptable. Firming the soil around the tree shall be done by hand only (no sticks, rocks, feet, etc. allowed) while the tree is placed in the middle of the hole.

J. Mixture of Planting Stock

In sub-items where more than one species will be planted, the seedlings shall be evenly distributed throughout the unit unless otherwise directed by the Contracting Officer.